

### **DETAILED ACTION**

This is a nonfinal office action.

Claims 1-16 are pending.

#### ***Priority***

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

#### ***Drawings***

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: **Figure 2**, number **18**. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

Art Unit: 1712

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 15 and 16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Support for claims 15 and 16 cannot be found in the original disclosure which is the PCT application filed 1/12/2005.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 15 and 16 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims refer to the pulverulent base material **consisting of** a reflective substance while they depend from a claim which pulverulent base material **comprises** a phosphor mixture (not reflective substance). As written the claims are contradictory. For the purpose of examination the claims are interpreted to mean that one layer comprises a phosphor mixture and a separate layer of reflective material is formed on top of that as "more than one functional layer is intended" from claim 1.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1712

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 1, 2, and 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over LEE et al. (US 2002/0187708) in view of CHADHA et al. (US 2003/0122477).**

Regarding claim 1,

LEE et al. teaches a method of producing a flat fluorescent lamp [0012] (discharge lamp) by providing spacers between the front plate and back plate [0013] (discharge vessel) and spraying a phosphor slurry (paste) [0013] on the surface of at least one of the front plate and back plate (at least part of the wall) [0013]. The slurry (pulverulent base material) contains a binder [0015] and a solvent [0016]. The limitation repeating the steps of forming a paste and applying the paste is not performed because it is not necessary.

Art Unit: 1712

The reference does not expressly teach using a polyalkylene carbonate as a binder in the phosphor slurry. However, CHADHA et al. teaches that it is known to use a binder to hold powder phosphor particles together, see **abstract**. The reference further teaches it is known to use polypropylene carbonate **[0007]**.

At the time of the invention it would have been prima facie obvious to use the polypropylene binder of CHADHA et al. with the method of LEE et al. because it is a simple substitution of known binders of phosphor particles.

Regarding claim 2,

LEE et al. teaches using a phosphor slurry **[0013]**.

Regarding claims 10 and 11,

LEE et al. further teaches adding a binder from 1 to 5% by weight (1 to 1.5% by weight) **[0015]**. See Obviousness of Ranges, MPEP 2144.05 I. CHADHA et al. teaches using a polypropylene carbonate **[0007]**.

Regarding claim 12,

LEE et al. teaches applying the fluorescent layer by screen printing and spraying **[0026]**.

Regarding claim 13,

LEE et al. teaches manufacturing a flat lamp **[0002]** and further teaches referring to **Figure 1** that the structure of a conventional flat fluorescent lamp include injected gas between the front plate **11** and back plate **12** and sealing (gas tight) the space between **[0007]** and where there are discharge electrodes **14** covered by a dielectric layer **15**.

Regarding claim 14,

Art Unit: 1712

LEE et al. teaches using discharge electrodes covered by a dielectric layer (dielectric barrier discharge).

**Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over LEE et al. (US 2002/0187708) and CHADHA et al. (US 2003/0122477) in further view of FUKUI (US 2003/0146395).**

Regarding claim 8,

Modified LEE teaches using a solvent and binder in the phosphor slurry but does not expressly teach ethyl acetate. However, FUKUI teaches using a binder and solvent for a phosphor layer [0079] where the solvent is ethyl acetate [0081]. At the time of the invention it would have been prima facie obvious to one of ordinary skill in the art to use the ethyl acetate solvent of FUKUI in the phosphor dispersion of LEE because it is a simple substitution of known phosphor solvents intended for coating.

**Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over LEE et al. (US 2002/0187708) and CHADHA et al. (US 2003/0122477) in further view of JUSTEL (US 2001/0033133).**

Regarding claim 3,

Modified LEE et al. teaches the limitations of claim 1 and 2 but does not expressly teach what phosphor to use. The phosphor is used to change the UV light generated by discharge gas into visible light [0008]. JUSTEL teaches that a phosphor particularly efficient when excited by UV light is  $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}$  [0003].

At the time of the invention it would have been prima facie obvious to one of ordinary skill in the art to use the phosphor of JUSTEL because it is an efficient phosphor.

**Claims 1, 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over SADOSKI et al. (US 3,717,781) in view of KODAS (US 2003/0108664).**

Regarding claims 1, 4 and 5,

SADOSKI teaches, referring to figure 1, providing a lamp envelope **1, column 2 lines 16-19**. A suspension of ultrafine aluminum oxide ( $\text{Al}_2\text{O}_3$ ) (pulverulent base material is a reflective substance), solvent and binder is created. The aluminum oxide is then applied over the entire inner surface of envelope **1, column 2 line 38-39** (applying to at least part of the wall). The reference does not expressly teach using a polyalkylene carbonate as the binder.

However, the polyalkylene carbonate can be used as a binder for aluminum oxide as shown in KODAS et al. which teaches a binder for precursor compositions being polyalkylene carbonates **[0129]** where the compositions include  $\text{Al}_2\text{O}_3$  nanoparticles **[0049]**. At the time of the invention it would have been prima facie obvious to use the binder of KODAS et al. as the binder in SADOSKI because it is a simple substitution of known binders used in compositions including  $\text{Al}_2\text{O}_3$ .

**Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over LANGER et al. (US 2003/0222061) in view of YAN et al. (Thermal decomposition behavior of PPC).**

Regarding claims 1 and 6,

Art Unit: 1712

LANGER et al. teaches applying a soldering glass with binder and solvent in an encapsulation process (providing a vessel), **abstract** to a seam between two glass panes (plates) [0026]. The soldering glass is pulverulent, see claim 4. The reference further teaches using a binder in the soldering glass that can be removed by heating in a suitable (generally oxidizing) atmosphere before the soldering glass softens [0016] but fails to teach the binder being a polyalkylene carbonate. Polyalkylene carbonates are known as binders that are thermally decomposable and polypropylene carbonate, which decomposes completely at temperatures above 300°C, see YAN et al. **Figure 1 page 435**, can be removed before the soldering glass softens as its decomposition temperature is less than the binders used in LANGER [0038]-[0039]. At the time of the invention it would have been prima facie obvious to one of ordinary skill in the art to use polypropylene carbonate as the binder in LANGER because it is a known binder that can be removed at a temperature before the soldering glass softens.

**Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over LANGER et al. (US 2003/0222061) in further view of EBERHARDT (US 2005/0176333).**

Regarding claim 7,

LANGER teaches using soldering glasses that include lead borate and phosphate glasses but does not expressly teach using Pb-B-Si-O. However EBERHARDT et al. teaches the sealing for a between a front a back plate for a fluorescent lamp can be do with soldering glass, specifically Pb-B-Si-O [0011]. At the time of the invention it would have been prima facie obvious to one of ordinary skill in

Art Unit: 1712

the art to use the soldering glass of EBERHARDT to seal the vessels in LEE by simple substitution of known soldering glasses.

**Claims 1 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over HAYASHI et al. (2002/0063527) in view of KODAS et al. (US 2003/0108664).**

Regarding claims 1 and 9,

HAYASHI et al. teaches referring to **figure 1** a two plate structure with partition walls **9** with phosphor layers **6** (providing a discharge vessel). HAYASHI further teaches “the partition walls **9** are obtained by coating a paint obtained by dispersing a resin (binder) and inorganic fine particles (pulverulent base material), which are glass powder and an organic solvent” **[0010]**. The partition walls **9** are shown applied to the dielectric layer **8** which is part of the vessel wall as indicated in **figure 1**. The reference further teaches that the solvent used is propylene glycol diacetate **[0024]**. The reference does not expressly teach the binder being a polyacrylene carbonate.

However, it is already known in the art that an appropriate binder for aluminum oxide (inorganic compounds capable of forming an insulating film **[0055]**) is polypropylene carbonate, see KODAS et al. which teaches a binder for precursor compositions being polyalkylene carbonates **[0129]** where the compositions include  $\text{Al}_2\text{O}_3$  nanoparticles **[0049]**. At the time of the invention it would have been prima facie obvious to one of ordinary skill in the art to use aluminum oxide as the insulative film of HAYASHI because it is a simple substitution of inorganic compound capable of forming an insulative film and use the binder of KODAS **[0129]** as a simple substitution of organic binders for aluminum oxide.



Art Unit: 1712

**Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over LEE et al. (US 2002/0187708) in view of CHADHA et al. (US 2003/0122477) in further view of SADOSKI et al. (US 3,717,781) and KODAS (US 2003/0108664).**

Regarding claim 15,

LEE teaches in [0007] a fluorescent lamp having a phosphor layer and reflective layer and teaches applying the phosphor layer according to claim 2. The reference does not expressly teach the deposition of the reflective layer. SIDOSKI, **column 2 lines 16-61** teaches the method of applying the reflective layer according to claim 4. At the time of the invention it would have been prima facie obvious to one of ordinary skill in the art to use the

Both SIDOSKI, **column 2 line 16-60** and LEE [0007] teach a fluorescent lamp having both a phosphor layer and a reflective layer. SIDOSKI teaches the method of applying the reflective layer, see rejection to claim 4 and LEE teaches the method of applying the phosphor layer see rejection to claim 2. At the time of the invention it would have been prima facie obvious to use modified LEE to produce the phosphor layer followed by modified SIDOSKI to create a fluorescent lamp with the layered structure by combining known prior art methods to yield a predictable result.

**Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over LEE et al. (US 2002/0187708) and CHADHA et al. (US 2003/0122477) JUSTEL (US 2001/0033133) in further view of SADOSKI et al. (US 3,717,781) and KODAS (US 2003/0108664).**

Regarding claim 16,

Art Unit: 1712

Modified LEE teaches the limitations of claim 1 and 2 for producing a fluorescent lamp and teaches a reflective layer **16** from figure 1 but does not teach applying the layer. Modified SIDOSKI, **column 2 lines 16-61** teaches the method of applying the reflective layer according to claim 4. At the time of the invention it would have been prima facie obvious to one of ordinary skill in the art to use the

Both SIDOSKI, **column 2 line 16-60** and LEE **[0007]** teach a fluorescent lamp having both a phosphor layer and a reflective layer. SIDOSKI teaches the method of applying the reflective layer, see rejection to claim 4 and LEE teaches the method of applying the phosphor layer see rejection to claim 2. At the time of the invention it would have been prima facie obvious to use modified LEE to produce the phosphor layer followed by modified SIDOSKI to create a fluorescent lamp with the layered structure by combining known prior art methods to yield a predictable result.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AUSTIN MURATA whose telephone number is (571)270-5596. The examiner can normally be reached on Monday through Friday 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MICHAEL CLEVELAND can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1712

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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